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V-22 OSPREY AIRCRAFT

Assessments Needed to
Address Operational and
Cost Concerns to Define
Future Investments

Statement of Michael J. Sullivan, Director
Acquisition and Sourcing Management



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Why GAO Did This Study

Since the 1980s, the V-22, developed to transport combat troops, supplies, and equipment for the U.S. Marine Corps and to support other services' operations, has experienced several fatal crashes, demonstrated various deficiencies, and faced virtual cancellation—much of which it has overcome. Although recently deployed in Iraq and regarded favorably, it has not performed the full range of missions anticipated, and how well it can do so is in question.

Given concerns about the V-22 program, GAO recently reviewed and on May 11, 2009, reported on MV-22 operations in Iraq; strengths and deficiencies in terms of the capabilities expected of the V-22; and past, current, and future costs. In that report, GAO recommended that the Secretary of Defense require (1) a new alternatives analysis of the V-22 and (2) that the Marine Corps develop a prioritized strategy to improve system suitability, reduce operational costs, and align future budget requests. The Department of Defense (DOD) concurred with the second recommendation, but not the first. GAO believes both recommendations remain valid. This testimony highlights GAO's findings from that report.

In speaking of the V-22, we are actually speaking of two variants of the same aircraft. The MV-22 is used by the Marine Corps; and the CV-22 by the Air Force to support special operations. This statement largely focuses on the MV-22, but also refers to the V-22 and CV-22.

View [GAO-09-692T](#) or key components. For more information, contact Michael J. Sullivan at 202-512-4841 or sullivanm@gao.gov.

May 2009

V-22 OSPREY AIRCRAFT

Assessments Needed to Address Operational and Cost Concerns to Define Future Investments

What GAO Found

As of January 2009, the 12 MV-22s in Iraq successfully completed all missions assigned in a low-threat theater of operations—using their enhanced speed and range to deliver personnel and internal cargo faster and farther than the legacy helicopters being replaced. However, challenges to operational effectiveness were noted that raise questions about whether the MV-22 is best suited to accomplish the full repertoire of missions of the helicopters it is intended to replace. Additionally, suitability challenges, such as unreliable component parts and supply chain weaknesses, led to low aircraft availability rates.

Additional challenges have been identified with the MV-22's ability to operate in high-threat environments, carry the required number of combat troops and transport external cargo, operate from Navy ships, and conduct missions in more extreme environments throughout the world. While efforts are underway to address these challenges, it is uncertain how successful they will be as some of them arise from the inherent design of the V-22.

The V-22's original program cost estimates have changed significantly. From 1986 through 2007, the program's Research, Development, Test, and Evaluation cost increased over 200 percent—from \$4.2 to 12.7 billion—while the cost of procurement increased 24 percent from \$34.4 to \$42.6 billion. This increase coincided with significant reductions in the number of aircraft being procured—from nearly 1,000 to less than 500—resulting in a 148 percent increase in cost for each V-22. Operations and support costs are expected to rise. An indication is the current cost per flying hour, which is over \$11,000—more than double the target estimate for the MV-22.

After more than 20 years in development, the MV-22 experience in Iraq demonstrated that the Osprey can complete missions assigned in low-threat environments. Its speed and range were enhancements. However, challenges may limit its ability to accomplish the full repertoire of missions of the legacy helicopters it is replacing. If so, those tasks will need to be fulfilled by some other alternative. Additionally, the suitability challenges that lower aircraft availability and affect operations and support costs need to be addressed. The V-22 program has already received or requested over \$29 billion in development and procurement funds. The estimated funding required to complete development and procure additional V-22s is almost \$25 billion (then-year dollars). In addition, the program continues to face a future of high operations and support cost funding needs, currently estimated at \$75.4 billion for the life cycle of the program. Before committing to the full costs of completing production and supporting the V-22, the uses, cost, and performance of the V-22 need to be clarified and alternatives should be re-considered.

Mr. Chairman and Members of the Committee:

I am very pleased to be here today to discuss the current status of the V-22 Osprey program. Since the V-22 Osprey began development in the mid-1980s, it has experienced several fatal crashes, demonstrated a variety of deficiencies, and faced the virtual cancellation of the program—much of which it has been able to overcome. There are two variants of the V-22 tilt-rotor aircraft currently being used. The MV-22 variant for the Marine Corps will replace the CH-46E helicopter as the Marine Corps' medium-lift aircraft—to be used along with the heavy-lift CH-53¹—to fulfill operational requirements such as transporting combat troops, supplies, and equipment. The Air Force's CV-22 variant will augment existing U.S. Special Operations Command aircraft. Until recently, the MV-22 was deployed in Iraq. While it accomplished assigned missions there, its usage did not encompass the full range of tasks anticipated for the aircraft. In addition, identified operational challenges raise questions concerning how effectively it can perform the full range of anticipated missions.

My testimony today is based on our recently issued report *Defense Acquisitions: Assessments Needed to Address V-22 Aircraft Operational and Cost Concerns to Define Future Investments*.² In view of our past work and others' highlighting concerns about the V-22 program, you asked us to determine whether the V-22 will perform as promised, and if it will, at what cost. To do this, we reviewed and reported on the system from three perspectives:

- Its operations in Iraq,
- Its strengths and deficiencies in terms of the capabilities expected of it, and
- Its past, current, and future costs.

Our work on both this testimony and the report on which it is based was conducted from June 2008 to May 2009 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our

¹CH-53 helicopters are also being used, in part, to conduct medium-lift operations for the Marines Corps.

²GAO, *Defense Acquisitions: Assessments Needed to Address V-22 Aircraft Operational and Cost Concerns to Define Future Investments*, GAO-09-482 (Washington, D.C.: May 11, 2009).

audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

The V-22 Osprey is a tilt-rotor aircraft—one that operates as a helicopter for takeoffs and landings and, once airborne, converts to a turboprop aircraft—developed to fulfill medium-lift operations such as transporting combat troops, supplies, and equipment for the U.S. Navy, Marine Corps, and Air Force special operations. Figure 1 depicts V-22 aircraft in various aspects of use.

Figure 1: Views of V-22 Aircraft in Various Aspects of Use



Source: U.S. Navy, U.S. Marine Corps.

The Osprey program was started in December 1981 to satisfy mission needs for the Army, Navy, and Air Force. Originally headed by the Army, the program was transferred to the Navy in 1982 when the Army withdrew from the program citing affordability issues. The program was approved for full-scale development in 1986, and the first aircraft was flown in 1989. A month after the first flight, the Secretary of Defense stopped requesting funds for the program due to affordability concerns. In December 1989, the Department of Defense (DOD) directed the Navy to terminate all V-22

contracts because, according to DOD, the V-22 was not affordable when compared to helicopter alternatives, and production ceased. Congress disagreed with this decision, however, and continued to fund the project. In October of 1992 the Navy ordered development to continue and awarded a contract to a Bell Helicopter Textron and Boeing Helicopters joint venture to begin producing production-representative aircraft.

Low-Rate Initial Production began in 1997. In 2000, the MV-22 variant began operational testing, the results of which led the Navy's operational testers to conclude that the MV-22 was operationally effective and was operationally suitable for land-based operations.³ Later evaluations resulted in testers concluding that the MV-22 would be operationally suitable on ships as well. Based on the same tests, DOD's independent operational testers concluded that the MV-22 was operationally effective but not operationally suitable, due in part to reliability concerns. Despite the mixed test conclusions, a Program Decision Meeting was scheduled for December 2000 to determine whether the V-22 should progress beyond low-rate initial production into full-rate production. Following two fatal crashes that occurred in 2000 and resulted in 23 deaths, the last one occurring just before the full-rate production decision, the V-22 was grounded and, rather than proceeding to full-rate production, the program was directed to continue research and development while low-rate production continued. Before the V-22 resumed flight tests, modifications were made to requirements and design changes were made to the aircraft to correct safety concerns and problems. A second round of operational testing with modified aircraft was conducted in June 2005. Both Navy and DOD testers then recommended that the aircraft be declared operationally effective and suitable for military use. The Defense Acquisition Board approved it for military use as well as full-rate production in September 2005.

³Operational Effectiveness is the measure of the overall ability of a system to accomplish a mission when used by representative personnel in the environment planned or expected for operational employment of the system. Operational Suitability is the degree to which a system can be placed and sustained satisfactorily in field use.

MV-22 Operations in Iraq Demonstrated Effectiveness for Assigned Missions but the Aircraft Continues to Experience Challenges

The MV-22 deployments in Iraq were considered successful. As of January 2009, the 12 MV-22s deployed in Iraq and utilized by three separate squadrons had successfully completed all missions assigned to them including general support—moving people and cargo—in what was considered an established, low-threat theater of operations.⁴ These deployments confirmed that the MV-22’s enhanced speed and range enable personnel and internally carried cargo to be transported faster and farther than is possible with the legacy helicopters the MV-22 is replacing. According to MV-22 users and troop commanders, its speed and range “cut the battlefield in half,” expanding battlefield coverage with decreased asset utilization and enabling it to do two to three times as much as legacy helicopters in the same flight time. Cited advantages include more rapid delivery of medical care, more rapid completion of missions, and more rapid travel by U.S. military officials to meetings with Iraqi leaders. The MV-22 also participated in a few AeroScout missions and carried a limited number of external cargo loads.⁵

However, questions have arisen about whether the MV-22 is the aircraft best suited to accomplish the full mission repertoire of the helicopters it is intended to replace, and some challenges in operational effectiveness have been noted. Also, aircraft suitability challenges, such as unreliable parts and supply chain weaknesses, drove availability significantly below minimum required levels.

The aircraft’s use in Iraq demonstrated operational challenges. For example, the introduction of the MV-22 into Iraq in combination with existing helicopters has led to some reconsideration of the appropriate role of each. Battlefield commanders and aircraft operators in Iraq identified a need to better understand the role the Osprey should play in fulfilling warfighter needs. They indicated, for example, that the MV-22 may not be best suited for the full range of missions requiring medium lift,

⁴Low threat includes sporadic small arms fire from random locations (maximum caliber 7.62 mm / .30 cal), and automatic weapons (assault rifles). Medium threat includes those threats, plus larger caliber weapons (.50 cal / 12.5 mm and 23mm, but not Anti-Aircraft Artillery (AAA)) adapted for anti-aircraft fire, more sophisticated aiming devices, and legacy man-portable air-defense systems. High threat environment may include mobile and/or stationary surface-to-air missiles, early warning radars, integrated AAA fire control systems, and interceptor aircraft.

⁵AeroScout missions were developed for and conducted by legacy helicopters. The concept arose prior to the V-22 arriving in Iraq. AeroScout missions are made to identify suspicious targets and neutralize those threats.

because the aircraft's speed cannot be exploited over shorter distances or in transporting external cargo. These concerns were also highlighted in a recent preliminary analysis of the MV-22 by the Center for Naval Analysis, which found that the MV-22 may not be the optimal platform for those missions.

Availability challenges also impacted the MV-22. In Iraq, the V-22's mission capability (MC) and full-mission capability (FMC) rates fell significantly below required levels as well as rates achieved by legacy helicopters.⁶ The V-22 MC minimum requirement is 82 percent, with an objective of 87 percent, compared with actual MC rates for the three squadrons of 68, 57 and 61 percent. This experience is not unique to Iraq deployment, as low MC rates were experienced for all MV-22 squadrons, in and out of Iraq. In comparison, the Iraq-based legacy helicopter MC rates averaged 85 percent or greater during the period of October 2007 to June 2008. Similarly, the program originally had a FMC requirement of 75 percent; but its actual rate of 6 percent in Iraq from October 2007 to April 2008 was significantly short of that, due in large part to faults in the V-22's Ice Protection System. In areas where icing conditions are more likely to be experienced, such as in Afghanistan, this may threaten mission accomplishment.

Repair parts issues and maintenance challenges affected the availability of MV-22s in Iraq. V-22 maintenance squadrons faced reliability and maintainability challenges, stemming from an immature supply chain not always responsive to the demand for repair parts and aircraft and engine parts lasting only a fraction of their projected service life. The MV-22 squadrons in Iraq made over 50 percent more supply-driven maintenance requests than the average Marine aviation squadron in Iraq. A lack of specific repair parts took place despite having an inventory intended to support 36 aircraft as opposed to the 12 aircraft deployed. However, only about 13 percent of those parts were actually used in the first deployment. In addition, many parts that were used were in particularly high demand, which led to a shortage that caused cannibalization of parts from other V-22s, MV-22s in the United States, and from the V-22 production line.

⁶An aircraft that is mission capable (MC) is one that is in a material condition to perform at least one of its designated missions, while an aircraft that is fully mission capable (FMC) is in a material condition to perform all of its designated missions. The program has modified the MC requirement by stating that this threshold should be achieved by the time the fleet completes 60,000 flight hours, which officials expect to occur sometime near the end of 2009.

Thirteen V-22 components accounted for over half the spare parts unavailable on base in Iraq when requested. These 13 lasted, on average, less than 30 percent of their expected life, and 6 lasted less than 10 percent of their expected life. V-22 engines also fell significantly short of service life expectancy, lasting less than 400 hours versus the program estimated life of 500-600 hours.

Operational Tests and Training Exercises Have Identified Challenges to Accomplishing Full Range of Possible Operations

V-22 missions in Iraq represent only a portion of the operations envisioned for the aircraft, but operational tests and training exercises have identified challenges in the V-22's ability to conduct operations in high-threat environments, carry the required number of combat troops and transport external cargo, operate from Navy ships, and conduct missions operating in more extreme environments throughout the world. While efforts are underway to address these challenges, success is uncertain since some of them arise from the inherent design of the V-22.

- **High-Threat Environments:** The Osprey was intended to operate across a spectrum of high-threat combat situations, facing a broad range of enemy land- and sea-based weapons. However, its ability to do so is not yet demonstrated.
 - The V-22 has maneuvering limits that restrict its ability to perform defensive maneuvers and it does not have a required integrated defensive weapon needed to suppress threats while approaching a landing zone, disembarking troops within the landing zone, or while leaving the landing zone. Currently, the Marine Corps intends to employ the aircraft in a manner that limits its exposure to threats—a change from the original intent that the system would be able to operate in such environments.
- **Transporting Personnel and External Cargo:** Operational tests and shipboard training exercises have determined that the capacity of the MV-22 to transport troops and external cargo is, in some cases, below program requirements.
 - The V-22 cannot carry a full combat load of 24 Marines if equipped as intended. The average weight of each Marine fully equipped with improved body armor and equipment has risen from 240 to 400 lbs. As a result, the aircraft can only transport 20 fully loaded combat troops rather than the 24-troop requirement. Troop-carrying capacity may be further reduced in other configurations and flight scenarios.
 - Most external cargo loads have not been certified for high-speed transport and thus would not enable the V-22's speed to be leveraged. Anticipated new and heavier equipment would not be able to be transported by the Osprey. A 2007 Center for Naval Analysis study

found that the MV-22 will not be able to externally transport heavier equipment, such as the Joint Light Tactical Vehicle—which is to replace the Marine Corps’ High-Mobility, Multi-Purpose Wheeled Vehicle (HMMWV). As a result, the study concluded that there will be less need for MV-22s for external lifting and an increased need for heavier lift helicopters.

- The weight of the MV-22 with added equipment planned as upgrades to currently configured aircraft may pose a moderate risk to the program. The heavier the aircraft is, the less it can carry. Weight growth as a result of planned MV-22 upgrades could reduce the aircraft’s operational utility transporting loads in higher altitude regions of the world, such as Afghanistan.
- **Operating on Navy Ships:** Efforts to ready the V-22 for deployment onboard Navy ships have identified numerous challenges.
 - Because it is larger than the helicopter it is replacing, ships can carry fewer V-22s than the predecessor aircraft. Also, the V-22 cannot fully utilize all operational deck spots on ships. The MV-22 is only cleared to take off and land from four of the six operational deck spots of the LHA- and LHD-class ships usable by CH-46s.
 - The Osprey’s large inventory of repair parts also constrains hangar deck space essential for maintenance actions on the V-22 and other aircraft. The space needed for its repair parts is so large that some parts may need to be prepositioned ashore.
 - Safety concerns caused by downwash have been documented. The V-22’s propellers create downwash significantly greater than that of the CH-46s it is replacing. The downwash impacts operations below the aircraft, including troop embarkation and debarkation, hooking up external loads, and fastroping.⁷ During shipboard exercises, the V-22’s downwash dislodged equipment such as life raft container securing bands and was so severe in one instance that another person was assigned to physically hold in place the sailor acting as the landing guide. Recently completed tests on the CV-22 found that the significant downwash also had various negative effects on land-based missions.
- **Challenges Operating Globally in Extreme Environments:** The Osprey’s ability to conduct worldwide operations in many environments is limited.
 - The V-22 had a requirement that its fuselage and cockpit be designed to restrict the entry of nuclear, biological, and chemical contaminants into

⁷Fastroping is a method used by troops to quickly exit a hovering aircraft.

the aircraft.⁸ During initial operational tests numerous problems existed with the seals that maintained cabin pressure, so the system could not be used. Without it, operational V-22s are forced to avoid or exit areas of suspected contamination and decontaminate affected aircraft, likely reducing their availability and sortie capability.

- The MV-22 is intended to support diverse mission requirements that will require it to fly during the day or at night, in favorable or adverse weather, and across a range of altitudes from close to the ground to above 10,000 feet above mean sea level. Current V-22 operating limitations do not support helicopter operations above 10,000 feet. The MV-22 currently does not have a weather radar and the Osprey's Ice Protection System is unreliable, so flying through known or forecasted icing conditions is currently prohibited.

V-22 Costs Rose While Performance Requirements Were Modified

V-22 Business Case and Acquisition Strategy Have Eroded as Costs Have Increased Significantly and Are Expected to Continue to Rise

The V-22's original program cost estimates have changed significantly as research and development, and procurement costs have risen sharply above initial projections. Operations and supports costs are just beginning and are expected to rise. This has taken place in spite of the fact that performance standards and metrics for V-22 were modified throughout the development effort.

From initial development in 1986 through the end of 2007, the program's Research, Development, Test, and Evaluation cost increased over 200 percent—from \$4.2 to \$12.7 billion—while its procurement cost increased nearly 24 percent from \$34.4 to \$42.6 billion.⁹ This increase coincided with significant reductions in the number of aircraft being procured—from nearly a thousand to less than 500 (most of which will be procured for the Marine Corps)—resulting in a 148 percent increase in procurement unit cost for each V-22. Operations and support (O&S) cost are also expected to rise. Table 1 details key aspects of the V-22 program's cost and schedule experience from development start to 2007.

⁸This requirement has since been dropped.

⁹Amounts are in constant fiscal year 2009 dollars.

Table 1: V-22 Cost, Quantity and Schedule Changes from Development Start to 2007

Costs in millions of constant fiscal year 2009 dollars

	1986	2007	Percentage change
Research & Development	\$4,211.8	\$12,682.0	201%
Procurement	\$34,362.9	\$42,585.2	24%
Procurement unit cost	\$37.7	\$93.4	148%
Average program unit cost (Research, Development, Test, and Evaluation plus Procurement costs)/Quantity	\$42.3	\$121.2	186%
Procurement quantities	913	456	-50.1%
Production years	1990-1999	1997-2018	
Initial operational capability	1992	June 2007	

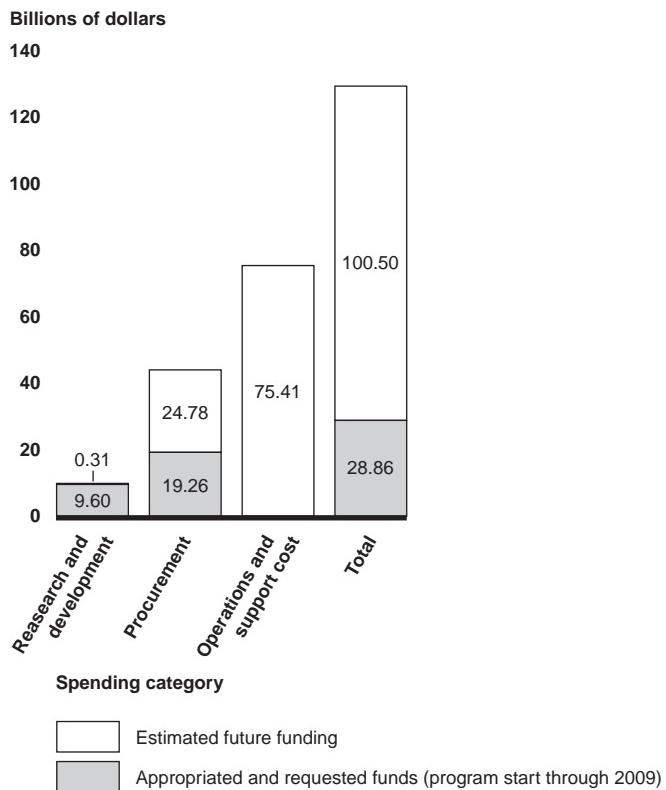
Source: GAO analysis of U.S. Navy V-22 Selected Acquisition Reports.

O&S costs—typically the largest portion of a weapon system’s total costs—are currently reported at \$75.41 billion for the life cycle of the program, but O&S costs for the program are just beginning and are expected to rise. One indication they may rise is the current cost per flying hour, which is over \$11,000—more than double the target estimate for the MV-22 as well as 140 percent higher than the cost for the CH-46E.¹⁰ The Osprey’s Iraq experience demonstrated that the rise in cost is due in part to unreliable parts, the cost of some parts, and required maintenance.

As illustrated in figure 2, the program’s estimated future funding needs are approximately \$100 billion (then-year dollars)—nearly \$25 billion in procurement and around \$75 billion in O&S.

¹⁰These data were gathered after the Material Support Date, October 1, 2008, when the Navy assumed responsibility for all spares and repair parts needed to support a new weapons system, subsystem, or support equipment end item at Fleet operational sites.

Figure 2: V-22 Funding Profile (Then-Year Dollars)¹¹



Source: V-22 December 2007 Selected Acquisition Report.

According to Marine Corps officials, the presence of unreliable parts contributed to reliability and maintainability issues for MV-22 deployed in Iraq, and a program is in place to address underperforming components. However, program management does not consider the current reliability and maintainability strategy to be coherent. Problems with parts reliability have resulted in more maintenance activity than expected, and if there is no improvement, overall cost and maintenance hours may remain high. Changes to the current engine sustainment contract with Rolls Royce—the

¹¹ O&S expenditures to date for the recently fielded MV-22 are not reported in the Selected Acquisition Report. O&S funding represents past and future funding needs. In fiscal year 2009 dollars, R&D would be \$12.6 billion in past funds and \$0.3 billion in estimated future funding; procurement would be \$21 billion in past funds and \$22.3 billion estimated future funding; and O&S would be \$54.5 billion in estimated future funding.

V-22's engine manufacturer—could also affect the program's already rising O&S costs.

Key Performance Standards and Other Performance Metrics for MV-22 Modified

Initially, the Marine Corps' proposed performance parameters for the V-22 were focused on speed, range, and payload. However, the Joint Requirements Oversight Council deferred consideration of system requirements until completing the 1994 Cost and Operational Effectiveness Analysis that validated the V-22 over other alternatives. While reports indicate that the MV-22 is meeting all its key performance parameters, program officials said modifications were made to balance aircraft operational requirements against technical risks and program costs. In 2001, for example, modifications consolidated 14 key performance parameters into 7 for the MV-22 variant.

While the office of the Director, Operational Test and Evaluation (DOT&E) found the MV-22 operationally effective in 2000, it did not find it operationally suitable, due in part to reliability concerns. Mission capability, one of the metrics used to measure suitability, was modified in 2004 such that the mission capability rate does not now have to be met until the aircraft reaches system maturity (60,000 flight hours), whereas the requirement previously specified no minimum required number of flight hours. According to Marine Corps Headquarters officials, the aircraft currently has over 50,000 hours and may reach the 60,000 hour threshold within a year.

Concerns about V-22 weight increase and how it may affect aircraft performance have continued. In 2005, a DOT&E report on the second operational test of the MV-22 predicted a drop in performance due to a projected weight increase. However, according to Navy operational testers who tested the aircraft in 2007, performance did not decrease. DOT&E did not report on the 2007 test. The program office is currently tracking weight increase in the newest version of the aircraft as a potential risk to the achievement of select key performance parameters.

Concluding Observations

After more than 20 years in development and 14 years since the last cost and operational effectiveness analysis was developed to reaffirm the decision to proceed with the V-22 program, the MV-22 experience in Iraq demonstrated that the Osprey can complete missions assigned in low-threat environments. Its speed and range were enhancements. However, challenges may limit its ability to accomplish the full repertoire of missions of the legacy helicopters it is replacing. If so, those tasks will

need to be fulfilled by some other alternative. Viewed more broadly, the MV-22 has yet to fully demonstrate that it can achieve the original required level of versatility. To be useful to the warfighter in a variety of climates and places, its ability to address and resolve a range of operational challenges must be re-evaluated. Furthermore, suitability challenges that lower aircraft availability and affect the operations and support funding that may be required to maintain the fleet need to be addressed. Based on the Iraq experience, the cost per flight hour is more than double the target estimate. DOD is therefore faced with the prospect of directing more money to a program, the military utility of which in some areas remains unproven. Now is a good time to consider the return on this investment as well as other less costly alternatives that may fill the current requirement.

The V-22 program has already received or requested over \$29 billion in development and procurement funds. The estimated funding required to complete the development and procure additional V-22s is almost \$25 billion (then-year dollars). In addition, the program continues to face a future of high operations and support cost funding needs, currently estimated at \$75.4 billion for the life cycle of the program. Before committing to the full costs of completing production and support the V-22, the uses, cost, and performance of the V-22 need to be clarified and alternatives should be reconsidered. Questions to consider include: To what degree is the V-22 a suitable and exclusive candidate for the operational needs of the Marine Corps and other services? How much will it cost? How much can DOD afford to spend? To what degree can a strategy be crafted for ensuring control over these future costs? If the V-22 is only partially suitable, to what degree can another existing aircraft or some mixture of existing aircraft (including V-22s) or a new aircraft perform all or some of its roles more cost effectively? Some consideration should be given to evaluating the roles such aircraft play in today's theaters of war and whether their performance warrants their cost.

Failure to re-examine the V-22 program at this point risks the expenditure of billions of dollars on an approach that may be less effective than alternatives. Furthermore, if the suitability challenges facing the program are not adequately addressed, the future cost of the program could rise significantly requiring funds that might otherwise be made available to satisfy other needs. This is why we recommended in our May 11 report that the Secretary of Defense (1) re-examine the V-22 by requiring a new alternatives analysis and (2) require the Marine Corps to develop a prioritized strategy to improve system suitability, reduce operational costs, and align future budget requests. DOD concurred with our second recommendation, but not the first. In non-concurring with our

recommendation for a new V-22 alternatives analysis, DOD stated that it supports validating required MV-22 quantities and the proper mix of aircraft, but not by means of a new V-22 alternatives analysis. Rather, DOD stated that planning for all elements of Marines Corps aviation (including required quantities, location, and employment of medium-lift assets) and total force affordability are reviewed and updated annually in the Marine Aviation Plan. We maintain our recommendation for a new alternatives analysis as a means of providing a comparison of a fuller range of alternatives, including their costs, operational suitability, and operational effectiveness under varying scenarios and threat levels. Furthermore, development of a V-22 alternatives analysis could assure congressional decision-makers that a reasoned business case exists that supports the planned acquisition of an additional 282 V-22s and an expenditure of almost \$25 billion in procurement funds in fiscal years 2010 and beyond.

Mr. Chairman, this concludes my prepared statement. I would be pleased to answer any questions that you or other Members of the Committee may have at this time.

GAO Contact and Staff Acknowledgments

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